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10/521,025

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Hae-Wook Lee

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EXAMINER

JACKSON, MONIQUE R

ART UNIT

PAPER NUMBER

1787

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|---------------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/521,025 | Applicant(s) LEE ET AL. | |
| | Examiner Monique R. Jackson | Art Unit 1787 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 6-8, 12, 14-19, 22-33 and 35-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-8, 12, 14-19, 22-33 and 35-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The amendment filed 9/23/10 has been entered. Claims 4-5, 9-11, 13, 20-21 and 34 have been canceled. Claims 1-3, 6-8, 12, 14-19, 22-33 and 35-43 are pending in the application. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

2. Claims 1-3, 6-8, 12, 14-19, 22-33 and 35-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1, 16, 29 and 30 recite the limitation “a surface charge mediating agent...providing the conductive nanoparticles with a same surface charge” however it is unclear to what the term “a same surface charge” or to what “same” refers, the same charge as the mediating agent? as the nanoparticles originally? etc.

Claim Rejections - 35 USC § 102/103

3. Claims 1-3, 7-8, 12, 15-18, 25, 29-32, and 34 are rejected under 102(a) as being anticipated by, or alternatively, under 35 U.S.C. 103(a) as being unpatentable over Ishihara et al (WO02/081131, 10/17/02, see USPN 7,494,710 for below references), for the reasons recited in the prior office action wherein the Examiner takes the position that though Ishihara et al does not specifically teach the claimed “same surface charge and electrical double layer”, Ishihara et al teaches the same materials as instantly claimed including the same nanoparticle material, same “surface charge mediating agent” and same solvent, in amounts as in the instant invention, and hence the claimed properties or surface charge and “electrical double layer” would be inherent to the teachings of Ishihara et al or would obviously flow naturally from the teachings of Ishihara.

Art Unit: 1787

4. As discussed in the prior office action, Ishihara et al teach a coating composition comprising dispersed conductive fine metal particles for producing a conductive coating film having electromagnetic shielding properties, wherein the fine metal particles have a particle size of 1 to 200nm, preferably 2 to 70nm (Abstract; Col. 3, line 45-Col. 4, line 20.) Ishihara et al teach that a matrix binder may be added to the coating with example thermosetting and thermoplastic resins including polycarbonate, polyamide, vinyl chloride, vinyl acetate, acrylic resins, urethane resins, epoxy resins, and melamine resins; in an amount of 0.01 to 0.5 parts by weight per part by weight of the fine metal particles (Col. 10, lines 17-35, *hence based upon the weight of the fine metal particles of 0.05 to 5wt% would range up to about 2.5wt%.*) Ishihara et al teach that the coating composition may further comprise an organic stabilizer to further improve the dispersibility of the fine metal particles such as polyvinyl alcohol, polyacrylic acid and polycarboxylic acids (*reads upon polymeric acid as well as resin binder*) and mixtures thereof; as well as an organic solvent such as ethylene glycol monomethyl ether, ethylene glycol monoethyl ether and ethylene glycol monobutyl ether; and may further contain other conductive fine particles other than the fine metal particles including tin oxide, tin oxide doped with Sb, and indium oxide doped with Sn, having an average particle diameter of 1 to 200nm, preferably 2 to 150nm (Col. 9, lines 33-Col. 10, line 48.) Ishihara et al teach that the fine metal particles are contained in an amount of 0.05 to 5wt%, based on the weight of the coating (Col. 9, lines 41-44) and that the additional conductive fine particles may be provided in an amount of up to 4 parts by weight per part by weight of the fine metal particles (Col. 10, lines 4-6.) The organic stabilizer may be contained in an amount of from 0.005 to 0.5 parts by weight, per part by weight of the fine metal particles (Col. 10, lines 49-56; *hence based upon the weight of the fine metal particles*

Art Unit: 1787

of 0.05 to 5wt% would range up to 2.5wt% giving a total "binder" content with the organic stabilizer above of up to 5wt% in the coating composition, reading upon the claimed "about 5" wt%.) With respect to the solvent amount, the Examiner takes the position that the remaining amount minus the solid content and other components taught by Ishihara et al would result in a solvent content that reads upon the claimed weight percent range. Ishihara et al teach that the substrate may be formed from glass, plastic or ceramic; and that the coating may be applied to the substrate and dried at a temperature from ordinary temperature to about 90C (Col. 11, lines 24-31; Col. 12, lines 11-35.) Ishihara et al teach that the coating may also be cured to cure the matrix ingredient with curing treatments including electromagnetic wave irradiation, thermal curing and curing with a gas (Col. 12, lines 36-44.) Ishihara et al further teach that the coated substrate may be provided on a display device to provide shielding properties and a dye or pigment may be further provided in the layer to absorb light having a specific wavelength (Col. 14, lines 10-52; *reads upon "heat-ray cutoff".*)

Claim Rejections - 35 USC § 103

5. Claims 1-3, 7-8, 12, 15-18, 25, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002216543A (JP '543) for the reasons recited in the prior office action and restated below wherein the Examiner takes the position that though JP'543 does not specifically teach the claimed "same surface charge and electrical double layer", JP'543 teaches the same materials as instantly claimed including the same nanoparticle material, same "surface charge mediating agent" and same solvent, in amounts as in the instant invention, and hence the claimed properties or surface charge and "electrical double layer" would obviously flow naturally from the teachings and suggestions of JP'543.

Art Unit: 1787

6. JP'543 teaches a low reflective, low resistant electrically conductive film comprising two layers, the first of which is formed from a coating composition comprising dispersed indium-tin-oxide particles, nitric acid and ethylene glycol ether (Abstract; Paragraphs 0002, 0013.) JP'543 teaches that the ethylene glycol ether is a monoether or cellosolve (Paragraph 0013) and that the ITO particles have an average primary particle diameter of 25-80nm (Paragraph 0014.) JP'543 teaches that the coating composition for the first layer comprises 5-60wt% cellosolve, 0.02-0.15wt% nitric acid, and 1.4-4.5wt% ITO particles to produce a first layer which preferably comprises 50 to 100% ITO particles (*wherein "heat-ray cutoff" properties would naturally flow*; Paragraphs 0019-0020.) JP'543 teaches that the first coating further comprises an organic solvent such as ethyl alcohol and an organic material comprising an unsaturated bond or polymer thereof, such as N-methyl pyrrolidone as utilized in the examples or those as recited in Paragraph 0009 (*reads upon resin binder*; Paragraphs 0009, 0025, 0027 and 0029; Examples.) JP'543 teaches that the first coating composition is applied to a transparent base such as a glass substrate, by a coating method such as spin coat or spray coating, and then dried, wherein after the second coating, the coated substrate is heated to 175°C (0027; Examples.) JP'543 specifically teach examples utilizing ethylcellosolve (*ethylene glycol monoethyl ether*), nitric acid, and ITO particles having an average particle diameter of 40nm and 50nm (Examples 2-7.) In terms of the instantly claimed resin binder content, though JP'543 teaches that the first coating composition may further comprise an organic material including organic polymers and that the layer formed from the first coating composition can comprise 50-100wt% ITO particles, JP'543 does not teach the content of resin binder provided in the dried layer or the coating composition as instantly claimed. However, given that JP'543 teaches that

Art Unit: 1787

the dried layer comprises 50-100wt% ITO particles, it would have been obvious to one having ordinary skill in the art at the time of the invention to utilize additional components in amounts from 0-50wt% based on the dried coating weight, such as the disclosed organic binders, wherein based upon the weight percentages disclosed by JP'543 would overlap the claimed binder content. Further, one having ordinary skill in the art at the time of the invention would have been motivated to utilize routine experimentation to determine the optimum content of each component with respect to the coating composition to provide the desired coating viscosity, final ITO content and resulting refractive index for a particular end use, given the predictable results and reasonable expectation of success, wherein JP'543 further teaches that the ITO layer may be utilized as a high refractive index layer or a middle refractive index layer (Paragraph 0029.)

7. Claims 1-3, 6-8, 12, 14-19, 22-33 and 35-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamoto in view of JP'543 or Ishihara et al for the reasons recited in the prior office action and restated below.

8. Kawamoto et al teach an ultrafine particle dispersion composition prepared by dispersing infrared ray shielding ultrafine particles having an average particle size of from 10 to 60nm, in a plasticizer as described at Col. 4, lines 1-28, and using this composition to obtain a infrared shielding film for windows, a laminated glass or an interlayer of a laminated glass which is excellent in infrared ray shielding performance, wherein the ultrafine particles are ITO, ATO, zinc oxide or titanium nitride fine particles (Abstract; Col. 5, lines 28-35; Col. 9, lines 11-15.) Kawamoto et al teach that the dispersion composition preferably comprises a dispersing agent and may further contain an organic solvent for the purpose of reducing the viscosity at the time of dispersion and improving the dispersibility, wherein suitable solvents include alkylene glycol

Art Unit: 1787

monoether type solvents such as ethylene glycol monomethyl ether and ethylene glycol monoethyl ether (Col. 6, lines 10-21; Col. 8, lines 22-52.) Kawamoto et al teach that the dispersion can be further diluted by a user with a plasticizer or solvent to the desired concentration for use (Col. 9, lines 1-4.) Kawamoto et al teach that an interlayer may be formed from the dispersion by incorporating the main constituent resin for the interlayer, and further, if necessary, a plasticizer and other additives, wherein the resin may be a polyvinyl butyral resin or ethylene vinyl acetate resin (Col. 9, lines 5-36.) Kawamoto et al teach that the ratio of plasticizer to ultrafine particles may suitably be determined depending upon the dispersibility of the ultrafine particles, the desired infrared ray shielding performance, or the nature of the ultrafine particles; wherein when ITO fine particles are used, the ratio of plasticizer is preferably within a range of 20 to 2000 parts by mass, per 100 parts of ITO particles (Col. 5, lines 65-Col. 6, lines 9.) In terms of the resin content for producing the interlayer, Kawamoto et al teach that the interlayer preferably contains ultrafine particles in an amount of 0.01 to 1 part by mass per 100 parts by mass of the total mass of the main constituting resin, the ultrafine particles, the plasticizer, and additives (*not including the solvent*; Col. 10, lines 31-39.) Kawamoto et al further teach that the composition may include other additives that read upon the claimed invention such as an adhesion-regulating agent (Col. 3-9.) Hence, one having ordinary skill in the art at the time of the invention would have been motivated to utilize an alkene glycol monoether type solvent as taught by Kawamoto et al, particularly ethylene glycol monomethyl ether and ethylene glycol monoethyl ether which read upon the claimed invention, wherein it would have been obvious to one having ordinary skill in the art at the time of the invention to utilize routine experimentation to determine the optimum content of ultrafine particles, solvent,

Art Unit: 1787

dispersing agent and resin to provide the desired viscosity and dispersibility as taught by Kawamoto et al for a particular end use or desired infrared shielding ability as taught by Kawamoto et al, given the predictable results and reasonable expectation of success.

9. Though Kawamoto et al teach a coating composition comprising a dispersion of conductive nanoparticles such as ITO or ATO nanoparticles, wherein the composition may further comprise dispersing aids to improve dispersibility of the particles in the composition, Kawamoto et al do not specifically teach the addition of the claimed acids. However, it is well established in the art that oxide particles can be surface treated with the instantly claimed acids to improve dispersibility of the particles wherein JP'543 and Ishihara et al each specifically teach similar ITO/ATO conductive particle dispersions comprising the claimed acids, wherein use of these claimed acids would provide the claimed same charge properties as well as claimed electrical double layer. Hence, it would have been obvious to one having ordinary skill in the art at the time of the invention to utilize any conventional dispersing aid including the instantly claimed, obvious acidic dispersing aids to improve the dispersibility of the particles in the invention taught by Kawamoto et al, wherein the claimed same charge properties and electrical double layer would flow naturally from the teachings and suggestions of Kawamoto et al in view of JP'543 and Ishihara et al.

10. With respect to the ATO particles, though Kawamoto et al fail to teach the content of Sb as instantly claimed, it would have been obvious to one having ordinary skill in the art at the time of the invention to utilize any conventional ATO or to determine the amount of antimony to provide the desired infrared shielding properties for a particular end use. With respect to the substrate material, though Kawamoto et al specifically teach glass, one having ordinary skill in

Art Unit: 1787

the art at the time of the invention would have been motivated to utilize the coating or infrared shielding film on functionally equivalent substrate materials such as plastic windows formed from polycarbonate or UV hardened acrylic resin, which are known functionally equivalent window substrates to glass, and would have been obvious to one having ordinary skill in the art at the time of the invention, wherein the heating temperature of the dispersion and as well the level of exposure to UV radiation can be determined by conventional, routine experimentation, with typical ranges falling within the claimed ranges. With respect to the thickness and properties listed in Claims 27 and 28, as previously discussed, one having ordinary skill in the art at the time of the invention would have been motivated to determine the optimum film thickness and optimum coating composition within the teachings of Kawamoto et al for a particular end use, wherein the claimed properties would flow naturally from the teachings of Kawamoto et al. Lastly, with respect to Claim 36, though Kawamoto et al teach that the composition can be utilized in various applications to provide infrared ray shielding properties, Kawamoto et al do not specifically teach a vessel comprising drinking water or foods as claimed, however, such use would have been obvious to one having ordinary skill in the art at the time of the invention.

Response to Arguments

11. Applicant's arguments filed 9/23/10 have been fully considered but they are not persuasive. The Applicant argues that the references fails to teach that the surface charge mediating agent or acids disclosed by the references would provide the conductive nanoparticles with the same surface charge and an electrical double layer formed of counter ions surrounding the conductive nanoparticles as claimed. However, given that the prior art references specifically teach the same conductive nanoparticles, same surface charge mediating agents or

Art Unit: 1787

acids as claimed as well as the same solvents as claimed in amount as in the instant invention, the Examiner takes the position that the claimed same surface charge and electrical double layer properties would be inherent and/or obviously flow naturally from the teachings and suggestions of the cited prior art. Hence, the Examiner maintains her position that the instantly claimed invention is taught and/or obvious over the teachings of the prior art.

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monique R. Jackson whose telephone number is 571-272-1508. The examiner can normally be reached on Mondays-Thursdays, 10:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1787

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Monique R Jackson/
Primary Examiner, Art Unit 1787
December 6, 2010